

CLAIMS

1. An active matrix electroluminescent display device comprising an array of display pixels, each pixel comprising:
 - 5 an electroluminescent (EL) display element (2) and a drive transistor (22) for driving a current through the display element (2);
 - a first switch (30) enabling power from a power supply line (26) to be supplied to the display element;
 - a second switch (32) for routing current from a current-measurement
 - 10 supply line (34) to the display element (2), the first and second switches (30, 32) being operated in complementary manner; and
 - a control line (6) for controlling the gate voltage applied to the drive transistor (22), wherein a feedback system is provided between the current-measurement supply line (34) and the control line (6).
- 15 2. A device as claimed in claim 1, wherein the feedback system enables a gate voltage to be determined corresponding to a desired current flow through the drive transistor (22).
- 20 3. A device as claimed in claim 1 or 2, wherein the feedback system is provided in a column driver of the display device.
4. A device as claimed in any preceding claim, wherein each pixel further comprises a storage capacitor (24) for storing a gate-source voltage of the
- 25 drive transistor (22).
5. A device as claimed in any preceding claim, wherein each pixel further comprises an address transistor (16) connected between the control line (6) and the gate of the drive transistor (22).

6. A device as claimed in claim 5, wherein the address transistor (16), and the first and second switches (30, 32) are each controlled by a shared control line.
- 5 7. A device as claimed in claim 6, wherein the address transistor (16) and the second switch (32) are controlled synchronously.
8. A device as claimed in any preceding claim, wherein each switch (30, 32) comprises a transistor.
- 10 9. A device as claimed in claim 8, wherein one (32) of the switches is an NMOS TFT and the other (30) is a PMOS TFT.
10. A device as claimed in any preceding claim, wherein the feedback
15 system comprises:
a current-to-voltage converter section (42) for providing a first voltage (43) corresponding to the current drawn from the current-measurement supply line (34);
a comparator section (50) for comparing the first voltage (43) with an
20 input voltage (52) representing the desired current; and
a drive section (50) for providing a voltage on the control line (6), the feedback loop being in equilibrium when the control line voltage provides drive of the drive transistor (22) giving rise to a current corresponding to the input voltage (52).
- 25 11. A device as claimed in any preceding claim, wherein the device is operable in two modes:
a first mode in which a desired pixel drive current is drawn from the current-measurement supply line (34) and the feedback system generates the
30 corresponding gate voltage for the drive transistor (22), the corresponding gate-source voltage for the drive transistor being stored; and

a second mode in which a current is driven through the drive transistor (22) and the EL display element (2) using the stored gate-source voltage.

12. A method of addressing an active matrix electroluminescent display device comprising an array of display pixels, in which each pixel comprises an electroluminescent (EL) display element (2) and a drive transistor (22) for driving a current through the display element, the method comprising, for each pixel:

applying a voltage to the drive transistor (22) to drive a current through the display element (2), the current being drawn from a current-measurement supply line (34);

processing the current using feedback control circuitry outside the array of pixels and having an input (52) representing the desired current;

generating a control voltage in the feedback control circuitry for the drive transistor (22) using the processed current, thereby implementing a feedback control loop which reaches equilibrium when the current corresponds to the desired current, and supplying the control voltage to the pixel;

within the pixel, storing a voltage derived from the control voltage; and

applying the stored voltage to the gate of the drive transistor (22) and drawing current from a power supply line (26) to illuminate the display element.

13. A method as claimed in claim 12, wherein processing the current comprises converting the current into a voltage, and comparing the voltage with an input voltage representing the desired current to produce an amplified differential output.

14. A method as claimed in claim 13, wherein the control voltage comprises the amplified differential output.

15. A method as claimed in any one of claims 12 to 14, wherein current is drawn from the power supply line through a first switch (30) and current is drawn from the current-measurement supply line (34) through a second switch

(32), the first and second switches being operated in complimentary manner, the first switch being used after an initial pixel programming phase and the second switch being used during the initial pixel programming phase.